

## NIMS - Callisto Science Objectives and Observational Plans

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The Galileo Near Infrared Spectrometer (NIMS) provides a combination of spectroscopic and imaging capabilities. For geological studies of Callisto, NIMS can perform regional mapping while simultaneously determining composition and mineralogy, thus providing data to help determine the surface evolution. The primary science objective for NIMS at Callisto is to identify the composition and spatial distribution of surface units. One important question concerning these units is the composition, variability, and origin of the "non-ice" material residing on Callisto's surface. NIMS is well suited to search for hydroxylated silicates, opaque minerals, and organic material and can detect absorption due to a range of iron bearing minerals. Minor volatile species maybe detectable in observations with good spatial and spectral resolution. Ground based spectral observations of Callisto have indicated absorption features present at 2.8, 2.9 and 3.4 micron and potentially a 3.1 micron feature which could prove to be ammoniated clays. A study of the mineralogy and chemical composition of Callisto's surface features is expected to provide invaluable insight into the processes which caused their formation.

Galileo's 2 year tour consists of 11 orbits of Jupiter, including 3 close encounters and 2 moderate distance passes near Callisto. Global context maps with 60 to 100 km spatial resolution and 204 wavelength spectral resolution will be obtained over nine orbits. However, due to tour geometry and telemetry constraints only ~50% of Callisto's surface will be mapped at this resolution. Regional observations with moderate spectral resolution (102 and 204 wavelengths) but improved spatial resolution (20 to 50 km) will be made of specific target areas such as the Asgard and Valhalla basin and multi-ring structures. High spatial/spectral observations (0.5 to 20 km, 102 to 408 wavelengths) of limited areal extent will be made of a tiny subset of the regional observations.

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